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**Contribution of ready-to-eat breakfast cereals to nutrient intakes in Irish children aged 5–12 years.** By E.M. HANNON and A. FLYNN, *Department of Food and Nutritional Science, University College Cork, Cork, Republic of Ireland*

The objective of the present study was to estimate the contribution of ready-to-eat breakfast cereals (RTEBC) to macro- and micronutrient intakes in Irish children aged 5–12 years, using data from the National Children's Food Survey (NCFS). The NCFS was carried out between April 2003 and April 2004 to establish a database of habitual food and drink consumption in a representative sample of Irish children aged 5–12 years. A 7 d weighed-food record was used to collect food-intake data (including supplements) from 594 children (293 boys, 301 girls). Analysis of dietary intake data was carried out using WISP© (Tinuviel Software, Llanfechell, Anglesey, UK), which contains data from *McCance and Widdowson's The Composition of Foods, 6th Edition*<sup>1</sup>.

Approximately 95% of boys and 91% of girls were RTEBC consumers and the average daily intake in consumers was 39 g (boys) and 27 g (girls).

	Contribution of RTEBC					
	Boys 5–12 years (n 293)			Girls 5–12 years (n 301)		
	Contribution		% total	Contribution		% total
	Mean	SD		Mean	SD	
Energy	0.59 MJ	0.42 MJ	7.8	0.39 MJ	0.31 MJ	5.8
Macronutrients						
Protein	2.9 g	2.4 g	4.9	1.9 g	1.6 g	3.5
Total fat	1.0 g	1.7 g	1.5	0.6 g	0.7 g	1.0
Saturated fat	0.3 g	0.5 g	1.1	0.2 g	0.2 g	0.8
Carbohydrate	30.9 g	21.4 g	12.4	20.5 g	16.6 g	9.4
Total sugars	8.1 g	8.4 g	7.3	5.7 g	5.9 g	6.0
Starch	22.7 g	15.7 g	17.6	14.8 g	12.2 g	13.0
Micronutrients						
Fe	3.7 mg	2.9 mg	33.3	2.4 mg	2.2 mg	26.6
Folate	64.9 µg	50.2 µg	26.5	44.8 µg	39.6 µg	21.1
Thiamin	0.4 mg	0.3 mg	26.4	0.3 mg	0.2 mg	20.7
Riboflavin	0.5 mg	0.4 mg	24.2	0.3 mg	0.3 mg	19.1
Vitamin B <sub>6</sub>	0.5 mg	0.5 mg	23.7	0.4 mg	0.3 mg	19.8
Niacin	6.0 mg	4.4 mg	19.4	4.0 mg	3.4 mg	14.9

In relation to their percentage contribution to mean daily intakes (MDI) of energy, RTEBC contribute lower percentages of MDI of protein, total fat and saturated fat, higher percentages of MDI of total carbohydrate and starch and the same percentage of MDI of total sugars. RTEBC contribute significant percentages of MDI (including supplements) of Fe, folate, thiamin, riboflavin, vitamin B<sub>6</sub> and niacin (boys 19–33%, girls 15–27%).

The study was funded by Kelloggs.

1. Food Standards Agency (2002) *McCance & Widdowson's The Composition of Foods Sixth Edition*. Cambridge: Royal Society of Chemistry.

**A systematic review of the effect of nutrition, diet and dietary change on learning, behaviour and performance of school-aged children.** By F.C. HILLER<sup>1</sup>, L.J. ELLS<sup>1</sup>, C.D. SUMMERBELL<sup>1</sup>, J. SHUCKSMITH<sup>1</sup>, H. CRAWLEY<sup>2</sup>, L.S. HARBIGE<sup>3</sup>, J. HAMILTON-SHIELD<sup>4</sup> and A. WIGGINS<sup>5</sup>, <sup>1</sup>*School of Health and Social Care, University of Teesside, Middlesbrough TS1 3BA, UK*, <sup>2</sup>*School of Life Sciences, Kingston University, Kingston-upon-Thames KT1 1LQ, UK*, <sup>3</sup>*School of Science, University of Greenwich, Kent ME4 4TB, UK*, <sup>4</sup>*Institute of Child Health, University of Bristol, Bristol, BS8 1TH, UK* and <sup>5</sup>*CEM Centre, Durham University, Durham DH1 3UZ, UK*

The Department for Education and Skills and the Food Standards Agency are committed to promoting healthier schools and lifestyles among schoolchildren, through improving the quality of school meals and national nutritional standards<sup>1</sup>. Whilst this commitment is primarily made on health grounds<sup>2,3</sup>, there is considerable interest in how good nutrition may also impact on behaviour, learning and performance. However, the current evidence base to support clear associations in this area is confusing and lacks cohesion. This systematic review aims to investigate the effects of nutrition, diet and dietary change on learning, behaviour and performance in school-aged children (4–18 years) from the UK and other developed countries.

MEDLINE, CINAHL, Psycinfo, BEI, ERIC, Australian ERIC, SSCI, ASSIA, International Bibliography of the Social Sciences, Sociological Abstracts, SPECTRE and ZETOC were searched. All peer-reviewed randomised case or cluster controlled trials undertaken in children from developed countries providing an exposure or intervention focusing on nutrition, diet or dietary change (achievable by diet alone) and at least one of the following outcomes were investigated: educational performance; behaviour; motivation.

Twenty-nine studies were included. Fifteen studies examined the effect of breakfast, of which ten identified an association between breakfast provision and some small cognitive and behavioural improvements. Six studies examined the effect of short-term exposure to sugar intake in populations of predominantly sufferers of attention-deficit hyperactivity disorder. No dramatic detrimental effects on educational or behavioural outcomes were observed. Five studies investigated the effect of fish oil supplementation in a population with symptoms of neurodevelopmental disorders; however, the findings were mixed and therefore inconclusive. Two studies examined the effect of vitamin and mineral supplementation: one showed a significant positive effect on IQ in a small sub sample; the other found no effect. The final study examined 'good diet' in the first year of school, but lacked sufficient detail and quality to inform the evidence base. Several studies lacked quality in research methodology and reporting (particularly those investigating breakfast consumption). Many studies failed to account for important confounders, such as habitual dietary intake, physical activity levels, locality and family context, whilst two-thirds of the studies were carried out in primary-aged children and over half took place over a short duration (<1 month).

Findings suggest there is insufficient evidence to identify any effect of nutrition, diet and dietary change on learning, education or performance of school-aged children from the developed world. Further research is required that must be of high quality, representative of all populations, undertaken for longer durations and use universal standardised measures of educational attainment. Challenges in terms of interpreting the results of such studies within the context of confounders such as family and community context, poverty, disease and the rate of individual maturation and neurodevelopment will remain.

This research was funded by the Food Standards Agency. The full report is available at the FSA website: <http://www.food.gov.uk/multimedia/pdfs/systemreview.pdf#page=1>

1. School Meals Review Panel (2005) *Turning the Tables: Transforming School Food*. <http://www.schoolfoodtrust.org.uk/UploadDocs/Library/Documents/SMRPReportAppendices.pdf>
2. Gregory J, Lowe S, Bates CJ, Prentice A, Jackson LV, Smithers G, Wenlock R & Farron M (2000) *National Diet and Nutrition Survey: Young People Aged 4–18 Years*. vol. 1: *Report of the Diet and Nutrition Survey*. London: The Stationery Office.
3. Nelson M, Bradbury J, Poulter J, McGee A, Msebele S & Jarvis L (2004) *School Meals in Secondary Schools in England*. London: Kings College London.